

LOCKE AVENUE BRIDGE

(State Bridge Number 805D04),
Locke Avenue (County Route 671) spanning Raccoon Creek
Swedesboro
Gloucester County
New Jersey

HAER No. NJ-110

HAER
NJ
8-SWEB01
2-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, P.A. 19106

HISTORIC AMERICAN ENGINEERING RECORD

LOCKE AVENUE BRIDGE
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HAER
NJ
8-SWEDBO,
HAER No. NJ-110

Location: Locke Avenue (County Route 671), Spanning Raccoon Creek
Swedesboro
Gloucester County, New Jersey

UTM: 18.472820.4400420
Quad: Bridgeport, New Jersey, 1:24,000

Date of Construction: 1911

Engineer: William C. Cattell

Builder: Owego Bridge Company

Present Owner: County of Gloucester
1 North Broad Street
Woodbury, New Jersey 08096

Present Use: Vehicular bridge

Significance: The Locke Avenue Bridge, constructed in 1911, is the only swing span and the oldest of three movable span bridges extant in Gloucester County, New Jersey. The bridge is distinctive as a small scale application of movable span bridge technology in use between the 1890s and 1920s. Numerous original characteristics of the bridge survive, including the riveted Warren pony steel truss, the wood plank deck, and the adjoining bridge tender's house. The bridge is also significant for its associations with commerce in Swedesboro and on Raccoon Creek.

Project Information: This documentation was undertaken in the Fall of 1996 in accordance with a Memorandum of Agreement between the Federal Highway Administration and the New Jersey State Historic Preservation Officer as a mitigative measure prior to bridge replacement.

Rebecca A. Hunt
Cultural Resources Group
Kise Franks & Straw, Inc.
Philadelphia, Pennsylvania

Description of the Locke Avenue Bridge and Its Setting:

The Locke Avenue Bridge is located in the northwest corner of the Borough of Swedesboro, Gloucester County, New Jersey. The bridge carries Locke Avenue, also known as County Route 671, over Raccoon Creek. Locke Avenue begins at Auburn Avenue (County Route 551) in Swedesboro, crosses Raccoon Creek into Woolwich Township, and extends approximately 1.4 miles north to Mullica Hill - Bridgeport Road (County Route 322). Raccoon Creek is one of the main creeks in Gloucester County that flow into the Delaware River. The Locke Avenue Bridge is eight miles from the mouth of the creek and is currently the fourth bridge upstream. The original bridge tender's house (HAER No. NJ-110-A) is located twelve feet from the south end of the bridge, on the east side of Locke Avenue. Other development on the south side of the bridge includes a working-class neighborhood east of Locke Avenue and an abandoned industrial complex west of Locke Avenue. The vicinity north of the bridge is characterized by cultivated fields and rural development.

The existing Locke Avenue Bridge was constructed between the summer of 1911 and the early months of 1912 as the second movable span bridge carrying Locke Avenue over Raccoon Creek. A movable span bridge was required in this location to accommodate the significant number of vessels using the creek. Since its founding, circa 1638, the town of Swedesboro marked the head of navigation on Raccoon Creek.¹ In the first half of the nineteenth century, before the opening of the railroad to Swedesboro in 1869, the majority of goods imported and exported through Swedesboro passed up and down the creek in light vessels.² Prior to 1833, five to six sloops carried timber from Swedesboro down the creek to Bridgeport and along the Delaware River, returning to Swedesboro with lumber and shingles.³ In 1833 or 1834, John Burk purchased a small sloop called the "Hornet" and began carrying a variety of produce once or twice a week between Swedesboro and James Wharf. Burk expanded his business in 1835 and purchased a larger boat, called the "Spy," which carried passengers as well as freight.⁴ Transportation of produce and passengers along Raccoon Creek by steamboat began in 1845 when the Steamboat Company was organized and their boat the "Independence" started making three trips a week between Swedesboro and the Delaware River. In 1849, after the "Independence" was sold, the steamboat "Osceola" ran along the creek until the outbreak of the Civil War.⁵

Transportation of freight by water to and from Swedesboro began to decline after the Civil War because of the introduction of the Swedesboro Railroad. By the early 1880s, the era of large sailing vessels carrying freight along the creek was coming to an end, and it was uncommon to see any of these vessels at Swedesboro's wharves. These changes did not lead to the end of commercial traffic on Raccoon Creek, but rather a temporary reduction of activity. Smaller

¹ Thomas Cushing and Charles E. Sheppard, *History of the Counties of Gloucester, Salem, & Cumberland, New Jersey* (Philadelphia: Everts & Peck, 1883), 300.

² Hazel B. Simpson, ed., *Under Four Flags; Old Gloucester County 1686-1964* (Woodbury, NJ: Board of Chosen Freeholders, Gloucester County, New Jersey, 1965), 79; Cushing and Sheppard, *History of the Counties of Gloucester, Salem, & Cumberland, New Jersey*, 300.

³ John Pierson, "Recollections of Early Navigation on Raccoon Creek," 1901, copy of article in Raccoon Creek File, Gloucester County Historical Society, Woodbury, New Jersey; H.C. Garrison, "Reminiscences by 'Gary,'" copy of article in Raccoon Creek File, Gloucester County Historical Society, Woodbury, New Jersey.

⁴ Pierson, "Recollections of Early Navigation on Raccoon Creek." Produce was commonly called truck or garden truck. James Wharf, later known as Springer's Wharf, was a prominent wharf between Swedesboro and Bridgeport.

⁵ Pierson, "Recollections of Early Navigation on Raccoon Creek."

vessels, such as canal boats and barges towed by tug-boats, continued to transport local produce, fertilizers, and coal.⁶

In 1882, the United States Army Corps of Engineers began examinations of Raccoon Creek and proposed projects for its improvement. As part of the River and Harbor Act of 2 August 1882, the creek was surveyed by the Corps of Engineers and a proposal for an improvement project was submitted on 26 February 1883.⁷ Due to lack of funds, no improvements were made at that date. The 3 March 1899 River and Harbor Act provided for another examination and survey of the creek. Two reports, dated 17 May and 11 December 1899, were produced by the Corps of Engineers and recommended that the creek be improved by dredging a channel that would remove 371,400 cubic yards and cost \$102,135.⁸ According to these studies, commerce on Raccoon Creek expanded dramatically in the 1880s and 1890s, with the value of freight transported increasing from \$304,895 in 1882 to \$1,274,950 in 1899. In recommending the dredging project, the May 17th report notes that "the improvement of the whole stream would largely increase the present commerce. The trucking interests are very large, and farmers depend principally on water transportation to obtain manure and other fertilizers and to get their crops cheaply to market."⁹

The 1899 reports illustrate the growing commercial activity on the creek at the turn of the century and provide detailed descriptions of the creek, its landings, products transported on the creek, and the number and types of vessels on the creek. These reports describe the creek relative to its three main centers: Bridgeport, two miles upstream from the mouth; Springer's Wharf, five miles upstream from the mouth; and Swedesboro, with its fixed highway bridge carrying Main Street (King's Highway) at the head of navigation of the creek, nine and three-quarter miles upstream from the mouth. In 1899, the four other bridges below the fixed bridge that were able to accommodate water traffic were the wood and iron Swedesboro Railroad bridge with a fixed span allowing a clear height of 22'-0" above low water, the wood and iron drawspan three-quarter miles below Swedesboro that preceded the existing Locke Avenue Bridge, a wood drawspan for the Delaware River Railroad at Bridgeport, and an iron draw county road bridge also at Bridgeport. Four of the eighteen landings on the creek during this period were located at Swedesboro. All these landings exported produce and sand, and imported manure, coal, lumber, merchandise, building materials, and hay. Eighty-eight percent of the 85,140 tons of freight, valued at \$440,200, imported to landings along the creek in 1899 arrived in Swedesboro. On the otherhand, forty-one percent of the 87,700 tons of freight, valued at \$834,750, exported from landings along the creek in 1899 departed from Swedesboro. The majority of the 30,000 tons of produce, valued at \$300,000, transported from Swedesboro by water was carried on four naphtha boats that made 720 round trips in 1899. Other vessels transporting freight to and from Swedesboro on the creek included barges and canal boats towed by tugs that made 125 round

⁶ Cushing and Sheppard, *History of the Counties of Gloucester, Salem, & Cumberland, New Jersey*, 300; H.C. Garrison, "Reminiscences by 'Gary'."

⁷ U.S. Congress, House, Secretary of War, *Examination and Survey of Raccoon Creek, New Jersey*, 56th Cong., 1st Sess., 1899, Doc. 231, on file at the Technical Library, United States Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania. See Annual Report of the Chief of Engineers for 1883, page 646 for details of the 1883 report.

⁸ These reports are printed in the U.S. Congress, House, Secretary of War, *Examination and Survey of Raccoon Creek, New Jersey*, 56th Cong., 1st Sess., 1899, Doc. 231, on file at the Technical Library, United States Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania.

⁹ U.S. Congress, House Doc. 231, 5-6.

trips, the steam barge "Willie" that made 145 round trips, and sailing vessels, that made 50 round trips.¹⁰

In the first three decades of the twentieth century, commerce remained very active in Swedesboro and along the Raccoon Creek. In 1902, the year Swedesboro was incorporated as a borough, a River and Harbor Act authorized dredging a canal in the creek from the Delaware River to Swedesboro.¹¹ This work began the following year. On 2 March 1907 another River and Harbor Act authorized a modification of the channel project to make a cut-off through the extremely sharp bends, known as Molonox Shoal, located two miles below Swedesboro.¹² Since the heaviest shipments were transferred at Swedesboro's wharves, the U.S. Army Corps of Engineers' *Annual Reports* for 1910-1912 suggested an additional modification of the channel project to extend the full channel depth to 7'-0" all the way to Swedesboro, instead of the planned 5'-0" depth from Springer's Wharf to Swedesboro.

The construction of the Locke Avenue Bridge in 1911 coincided with the navigation improvements to Raccoon Creek. At this date, Raccoon Creek was known as "one of the largest and most navigable of the lower tributaries of the Delaware [River]," and it played an important role in transporting freight to the Delaware River and Philadelphia.¹³ The 1911 bridge replaced an 1887 cable-stayed truss, center-bearing swing bridge and nearly doubled the horizontal clearance from 36'-6" to 64'-0".¹⁴ Three reports generated between 1913 and 1914 as a result of the River and Harbor Act of 4 March 1913 provide detailed information about the activity on the creek shortly after the new bridge was constructed. These reports continue to promote the project to extend the 7'-0" channel depth all to Swedesboro, originally proposed in 1910, and also mention constructing a jetty as a protective barrier at the mouth of the creek. In support of the proposed project, these reports describe the creek as "a busy stream with a well-established commerce."¹⁵ The large amount of traffic passing through the Locke Avenue Bridge juncture at

¹⁰ U.S. Congress, House Doc. 231, 2-9. The term draw or drawspan is used in historical documents as a general term for a moveable span bridge and does not necessarily indicate a specific type of moveable span. For comparison, in 1899, 30 to 50 carloads of produce were shipped by rail each day throughout the produce season. Naphtha boats, also known as naphtha launches, were a common type of small boat at the turn of the twentieth century, powered by internal combustion engines that burned naphtha.

¹¹ U.S. Army Corps of Engineers, *Annual Report*, 1915 (Washington, D.C.: U.S. Government Printing Office), 338, on file at the Technical Library, United States Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania. The specifications for the channel were: 7'-0" deep and 75'-0" wide from the Delaware River to Bridgeport; 7'-0" deep and 60'-0" wide from Bridgeport to Springer's Wharf; and 5'-0" deep and 40'-0" wide from Springer's Wharf to Swedesboro.

¹² U.S. Congress. House. Secretary of War. *Raccoon Creek, New Jersey*, 63rd Cong., 2nd sess., 1914. Doc. 800, 4, on file at the Technical Library, United States Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania.

¹³ Wilmer Egee and Edmund Burk, *Swedesboro Yesterday and Today* (Philadelphia: The Literary Bureau, 1910), 31.

¹⁴ This 1887 bridge is believed to be the first bridge at this crossing. It was built by John M. Powell and completed on 17 November 1887 for \$4,950 (Jack Adams, Telephone Interview by Rebecca A. Hunt, 27 September 1996). For additional information about the 1887 Locke Avenue Bridge, see the 1911 drawing of the elevation included on the permit for the new bridge (on file at the Office of the County Engineer, County of Gloucester, Clayton, New Jersey) and the 1899 map showing the bridge in a plan of the creek (included in the U.S. Congress, House, Secretary of War, *Examination and Survey of Raccoon Creek, New Jersey*, 56th Cong., 1st Sess., 1899, Doc. 231, on file at the Technical Library, United States Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania).

¹⁵ R.R. Raymond, United States Engineer Office, "Survey of Raccoon Creek, N.J.," 16 December 1913, printed in U.S. Congress, House Doc. 800, 8.

this date is inferred by the statement that "the heaviest receipts and shipments [on the Raccoon Creek] are made at the wharves at Swedesboro."¹⁶ Furthermore, the 1911 Locke Avenue Bridge is mentioned in the context of the proposed project as requiring "proper approaches in the stream and the clearing out of obstructing shoals in one draw opening."¹⁷

In 1915, the Corps of Engineers reported that the original dredging project was 95 percent complete and that bulky freight could be carried by water at half the cost of transporting it by rail.¹⁸ It was not until four years later, on 2 March 1919; however, that the 7'-0" depth extension to Swedesboro and the jetty at the mouth were authorized in a River and Harbor Act.¹⁹ Finally, in 1922, the dredging projects on Raccoon Creek authorized by the Corps of Engineers in 1902, 1907, and 1919 were finished.²⁰ The completion of this project occurred in the same year that the north abutment of the Locke Avenue Bridge was rebuilt, and the bridge achieved its present configuration.²¹ In the flourishing years of the early 1920s, Swedesboro was notable as one of the largest shipping stations for tomatoes in the country, and as one of the wealthiest communities in Gloucester County.²² Swedesboro was also established as a leading producer of sweet potatoes, asparagus, melons, peppers, and eggplants.²³

By the late 1950s, barges maneuvered by tugs still carried freight along Raccoon Creek, but the peak of commercial activity on the creek had passed. Corresponding with this decline, in 1959 the County Engineer submitted a request to the Corps of Engineers to discontinue full-time opening and closing of the bridge in the off-season months of December, January, and February. This request was denied because there was still enough activity on the creek to generate protests against this reduction in operation.²⁴ In 1961, the County considered constructing a new fixed bridge in this location, and a proposal was made that "the warehouse, being supplied by the lone vessel using this stream, be relocated downstream from the present bridge."²⁵ This vessel was a fertilizer freighter operated by the Wright Brothers of Bridgeport, the only boat operators still

¹⁶ R.R. Raymond, United States Engineers Office, "Preliminary Examination of Raccoon Creek, N.J.," U.S. Congress, House Doc. 800, 5.

¹⁷ R.R. Raymond, United States Engineer Office, "Survey of Raccoon Creek, N.J.," U.S. Congress, House Doc. 800, 7.

¹⁸ U.S. Army Corps of Engineers. *Annual Report*, 1915, Washington, D.C.: U.S. Government Printing Office, 338, on file at the Technical Library, United States Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania.

¹⁹ U.S. Army Corps of Engineers. *Annual Report*, 1938, Washington, D.C.: U.S. Government Printing Office, 344, on file at the Technical Library, United States Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania.

²⁰ *Ibid.*, 345.

²¹ Office of the County Engineer, County of Gloucester, "New Abutment and Wing Walls for the Northerly End of Draw Bridge No. 5-D-4AT, Swedesboro-N.J.," on file at the Office of the County Engineer, County of Gloucester, Clayton, New Jersey.

²² Alfred M. Heston, *South Jersey; A History 1664-1924*, vol.1 (New York: Lewis Historical Publishing Co., Inc., 1924), 472. These goods were shipped by both boat and rail.

²³ *Ibid.*

²⁴ T.H. Setliffe, Colonel, U.S. Army Engineer District, Philadelphia to William A. Baum, Gloucester County Engineer, 8 October 1959, on file in Bridge No. 5-D-4 Files, Office of the County Engineer, County of Gloucester, Clayton, New Jersey.

²⁵ William H. Baum, County Engineer to Major Dean W. Thorpe, U.S. Army Engineer District, Philadelphia, 26 October 1961, on file in Bridge No. 5-D-4 Files, Office of the County Engineer, County of Gloucester, Clayton, New Jersey.

involved in commercial hauling on Raccoon Creek.²⁶ In 1965, the scheduled maintenance program for Raccoon Creek by the Corps of Engineers ended, and the creek was dredged for the last time.²⁷ Consequently, with the lack of commercial traffic and dredging maintenance, the bridge was fixed in a closed position in 1971.²⁸ Since that date, the only boats on the creek have been recreational types.

The present Locke Avenue Bridge was designed by the County Bridge Engineer, William C. Cattell, and built by the Owego Bridge Company of Owego, New York.²⁹ In May 1911, the contract for building the bridge was awarded to the Owego Bridge Company with an estimated construction cost of \$11,371.³⁰ The permit for building the new bridge was issued on 31 May 1911 with an expected completion date of 31 December 1911. In early September, the Owego Bridge Company submitted the shop plans to the County.³¹ By November, the bridge was well under construction, and it was completed in the early weeks of 1912.³²

The Locke Avenue Bridge is a two-span, center-bearing, riveted Warren steel truss, swing highway bridge. The bridge deck was constructed 5'-8" above high water level. The overall length of the bridge is 154'-6". The bridge width is 15'-2" from the center line of the trusses. The clear roadway width is 15'-0". The bridge accommodates one lane of traffic even though it adjoins a two-lane road.³³ The wood piling barriers on the cross-axis of the bridge extend 73'-5" downstream and 77'-0" upstream.³⁴

²⁶ Simpson, *Under Four Flags*, 87.

²⁷ "Condition of Improvement, 30 September 1994," Survey and Permit Records, U.S. Army Corps of Engineers, Philadelphia, Pennsylvania.

²⁸ Cipolla, Russell D. "Reconstruction of Locke Avenue Bridge Over Raccoon Creek and Locke Avenue; Gloucester County, New Jersey." Senior design thesis, Drexel University, 1988.

²⁹ There is very limited information known about the Owego Bridge Company. Three other bridges constructed by the Owego Bridge Company and recorded in the A.G. Lichtenstein & Associates, Inc.'s "New Jersey Historic Bridge Survey" are a 1912 Pratt thru-truss center-bearing swing span bridge carrying Lawrence Street over the Rahway River in Rahway City, New Jersey (State Structure Number 2013-023); a 1906 thru-truss rim-bearing swing span bridge carrying Gregory Avenue over the Passaic River in Passaic City, New Jersey (State Structure Number 1600-002); and a 1905 a Parker thru-truss bridge carrying Arch Street over the Passaic River in Paterson City, New Jersey (State Structure Number 1600-015).

³⁰ *The Woodbury Constitution*, 24 May 1911, on file at the Gloucester County Historical Society, Woodbury, New Jersey.

³¹ Shop Plans marked Owego Bridge Co., Owego, NY, dated 1 September 1911, on file at the Office of the County Engineer, County of Gloucester, Clayton, New Jersey.

³² *The Woodbury Constitution*, 8 November 1911; The exact completion date for the bridge is not known; however the 13 December 1911 issue of the *Woodbury Constitution* records that the contractors hoped to finish the work by January 15th. A search of the *Woodbury Constitution* through February 1912 did not reveal any additional information about the completion of the bridge.

³³ Unless otherwise noted, dimensions noted throughout this description were obtained from the original construction drawing, entitled "Bridge Over Raccoon Creek at Swedesboro, N.J.," on file at the Office of the County Engineer, County of Gloucester, Clayton, New Jersey. Descriptive information about the appearance of the bridge was obtained from the original construction drawing and "Historic Bridge Alternatives Analysis, Locke Avenue Bridge over The Raccoon Creek, Swedesboro Borough/ Woolwich Township, Gloucester County," Draft, prepared by Bettigole Andrews & Clark, Inc., 1993, on file at the Office of the County Engineer, County of Gloucester, Clayton, New Jersey.

³⁴ U.S. Engineer Office, "Detail of New Highway Bridge Below Swedesboro, N.J." on "Raccoon Creek, New Jersey, From Swedesboro to Springer's Wharf, compiled from surveys of 1899 & 1913, and at the Mouth, from Survey of 1913," Sheet 1, in House Doc. No. 800, 63rd Cong., 2nd Sess.

Swing bridges were the first type of bridge designed to have a movable span of substantial size.³⁵ They were a popular type of bridge constructed over navigable waterways in the United States between the 1880s and 1920s.³⁶ Swing bridges pivot on a horizontal axis to provide clearance over the waterway and allow vessels to pass through the highway crossing. The two types of swing spans are center-bearing, which pivots on a central pier, and rim-bearing, which pivots on roller bearings or wheels on a circular steel track. Some long bridges were constructed with both types of pivot mechanisms. The earliest swing bridges were opened by being bumped by the approaching vessel, but most were powered either by hand, steam engines, gasoline engines, or electrical motors. The truss configuration on swing bridges is typically deeper over the central pier. The Warren truss, patented by Captain James Warren in 1848, became widely used in the United States for numerous types of bridges in the early twentieth century because of the development of field riveting.³⁷ This type of truss is characterized by diagonal structural members. When the diagonal members exist in combination with vertical members, as found on the Locke Avenue Bridge, it is called a Warren truss with verticals. Statistics from 1994 show that over sixty-five movable span bridges constructed in the United States between 1896 and 1942 are extant, and most of them are located in the Northeast and in coastal areas.³⁸ The same statistics reveal that there are a total of twenty-one extant swing spans bridges in New Jersey; three from the nineteenth century and nineteen from the twentieth century.³⁹

The superstructure of the Locke Avenue Bridge consists of two Warren pony steel trusses, a wood deck, and a steel I-beam deck structure. The steel trusses are each constructed of nine riveted steel trusses that increase in height from 8'-0" at the bridge ends to 12'-0" in the center. The top and bottom chords are double channels. The diagonal members are constructed of two 5" x 3" x 3/8" L-plates. The vertical members are constructed of two 3" x 3" x 5/16" L-plates. All of these paired members are connected with steel lacing bars and gusset plates. The present deck is constructed of timber planks laid perpendicular to the bridge axis, but the original drawings indicate that the deck was designed to be laid diagonally on a seventy-degree angle. The deck flooring is laid on six longitudinal 31.5-pound I-beams, that are 12" high, except in the end bays where they are 25 pounds and 10" high. These I-beams are supported by nine 55-pound, 18", lateral I-beams that are located at the base of each vertical truss member. Two 4" x 3" x 3/8" L-beams extend diagonally between the lateral I-beams in each bay. Molded steel fenders extend along the length of the bridge. An older fender system, attached to round steel rails, is extant on the south approach, but the north approach has modern fenders that do not match any other elements on the bridge.

The substructure of the bridge is composed of reinforced concrete abutments and a central concrete pier. The south abutment is constructed on pilings driven to refusal. The north abutment was originally constructed with a new concrete section integrated into a stone abutment, that is believed to have been part of the earlier bridge. The existing reinforced concrete north abutment replaced the original abutment in 1922. The central pier is constructed of reinforced concrete on pilings. It is elliptical, with an approximately 17" diameter along the bridge axis, and encased in steel sheets.

³⁵ The other two types of movable span bridges are lift and bascule.

³⁶ Donald C. Jackson, *Great American Bridges and Dams* (Washington, D.C.: Preservation Press, 1988), 32.

³⁷ Jackson, *Great American Bridges and Dams*, 27-29.

³⁸ A.G. Lichtenstein & Associates, Inc., "The New Jersey Historic Bridge Survey," Draft, 1994, 69.

³⁹ *Ibid.*, 70.

The bridge was designed to be manually operated from the center of the deck by a large three-pronged key that was inserted through a hole in the deck and connected to gears below. Two people would open and close the bridge by turning the upper two arms of the key, like a capstan, to move the gears on the central pivot. The center pivot is a conical roller type with a steel live ring and cast steel stability rollers. In the open position, the bridge was supported entirely by the central pier. In the closed position, it rests on three pairs of cast steel rollers that sit on a ledge of each abutment. The bridge is manually locked and unlocked from the closed position by turning two steel wheels on each side of the trusses that are connected to two latches at each end of the bridge. Modern I-beams are bolted to the center pier and adjoining part of the trusses to secure the bridge in its current, inoperable, fixed position.

Other than the reconstruction of the north abutment and wing wall in 1922, alterations to the Locke Avenue Bridge have been minimal. Most of the work on the bridge has been maintenance-related projects such as wood deck replacement, fender repairs, and painting. The chronology of alterations and repairs to the bridge includes:⁴⁰

- 1922 Stone abutment on north end replaced with new concrete abutment and wing wall by Kolyn Construction
- 1929 New fender system by C. Fiske Campbell of Bridgeton, NJ
- 1942 Emergency deck replacement repairs
- 1947 Entire bridge painted by Damask Brothers
- 1951 Deck replacement
- 1952 Painting of superstructure
- 1953 Fender repair
- 1959 Cleaning and painting iron structural work
- 1961 Swing span mechanism and fender repair and deck replacement with Southern Yellow pine
- 1963 Repairs and greasing
- 1971 Locked in fixed, inoperable position by I-beams bolted to center pier
- 1972 Deck and wood nailer replacement
- 1982 Painting of superstructure
- 1986 Deck replacement, repairs to concrete abutments and structural steel, and painting by Foundations & Structures, Inc. of Tuckahoe, NJ

⁴⁰ The information contained in the following chronology of alterations and repairs was obtained from the Bridge 5-D-4 files at the Office of the County Engineer, County of Gloucester, Clayton, New Jersey. These files contain copies of the 1922 drawings for the new abutment (entitled "New Abutment and Wing Walls for the Northerly End of Draw Bridge No. 5-D-4AT, Swedesboro - N.J.") and the 1929 drawings for the new fender system (entitled "Plan Showing Location, Renewal of Fender at Swing Bridge Over Raccoon Creek, Swedesboro, Gloucester County N.J.").

The condition of the bridge was downgraded from poor to serious in May 1993 due to the superstructure deterioration.⁴¹ Plans have been developed to replace this bridge because of the low five-ton load capacity, the deteriorated condition of the superstructure, and the substandard design characteristic of a one-lane bridge for a two-lane highway.

⁴¹ Bettigole Andrews, & Clark, Inc. "Historic Bridge Alternatives Analysis: Locke Avenue Bridge Over The Raccoon Creek, Swedesboro Borough/Woolwich Township, Gloucester County," Draft, on file at the Office of the County Engineer, County of Gloucester, Clayton, New Jersey.

SOURCES OF INFORMATION

Engineering drawings:

Office of the County Engineer, County of Gloucester. "Bridge Over Raccoon Creek at Swedesboro, N.J." Original construction drawings on file at the Office of the County Engineer, County of Gloucester, Clayton, New Jersey.

Interviews:

Adams, Jack. Telephone Interviews by Rebecca A. Hunt. 27 September 1996, 1 October 1996, and 18 October 1996. (Jack Adams is a Swedesboro Historian who has done extensive research compiling information from the *Woodbury Constitution*, the local newspaper.)

Bibliography:

1. Primary and unpublished sources:

A. G. Lichtenstein & Associates, Inc. "The New Jersey Historic Bridge Survey - Draft." 1994. On file at the Bureau of Environmental Analysis, New Jersey Department of Transportation, Trenton, New Jersey.

Bridge No. 5-D-4 Files. Office of the County Engineer, County of Gloucester, Clayton, New Jersey.

Bridges (Other) File. Gloucester County Historical Society, Woodbury, New Jersey.

Cipolla, Russell D. "Reconstruction of Locke Avenue Bridge Over Raccoon Creek and Locke Avenue; Gloucester County, New Jersey." Senior design thesis, Drexel University, 1988.

Crane, William J. "Colonial Swedesboro, New Jersey." Master's thesis, Glassboro State College, 1976.

Gloucester County (Rivers, Creeks) File. Gloucester County Historical Society, Woodbury, New Jersey.

Kise Franks & Straw. "New Jersey Statewide Historic Context; Immigration and Agricultural, Industrial, Commercial, and Urban Expansion 1850-1920." December 1990. On file at the New Jersey Historic Preservation Office, Trenton, New Jersey.

Map of Farms in the Vicinity of Swedesboro, N.J. February 1908. On file at the U.S. Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania.

New Jersey Department of Transportation - Bureau of Bridges & Structures. "Investigation, Evaluation and Rating Bridge Survey Report, Bridge No. 5-D-4." 7 November 1987. On file at the New Jersey Department of Transportation, Bureau of Bridge Inspection, Trenton, New Jersey.

Raccoon Creek File. Gloucester County Historical Society, Woodbury, New Jersey.

Survey and Permit Records. U.S. Army Corps of Engineers, Philadelphia, Pennsylvania.

Swedesboro (History) File. Gloucester County Historical Society, Woodbury, New Jersey.

U.S. Army Corps of Engineers. *Annual Reports*, 1915, 1938, and 1981. Washington, D.C.: U.S. Government Printing Office. On file at the Technical Library, United States Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania.

U.S. Army Corps of Engineers. Project and Index Maps for River and Harbor Projects. On file at the Technical Library, United States Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania.

U.S. Congress. House. Secretary of War. "Examination and Survey of Raccoon Creek, New Jersey." 56th Cong., 1st sess., 1899. Doc. 231. On file at the Technical Library, United States Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania.

U.S. Congress. House. Secretary of War. "Raccoon Creek, New Jersey." 63rd Cong., 2nd sess., 1914. Doc. 800. On file at the Technical Library, United States Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania.

2. Secondary and published sources:

Comp, T. Allan and Donald Jackson. "Bridge Truss Types: A Guide to Dating and Identifying." *American Association for State and Local History Technical Leaflet 95, History News 32* (May 1977).

Cushing, Thomas and Charles E. Sheppard. *History of the Counties of Gloucester, Salem, and Cumberland, New Jersey*. Philadelphia: Everts & Peck, 1883.

Darnell, Victor C. *Directory of American Bridge-Building Companies 1840-1900*. Society for Industrial Archeology Occasional Publication No. 4. Washington, D.C.: Society for Industrial Archeology, 1984.

Egee, Wilmer and Edmund Burk. *Swedesboro Yesterday and Today*. Philadelphia: The Literary Bureau, 1910.

Heston, Alfred M. *South Jersey; A History 1664-1924*. 5 vols. New York: Lewis Historical Publishing Co., Inc., 1924.

Historic Highway Bridges In Pennsylvania. Harrisburg, PA: Commonwealth of Pennsylvania, Historical and Museum Commission, Pennsylvania Department of Transportation, 1986.

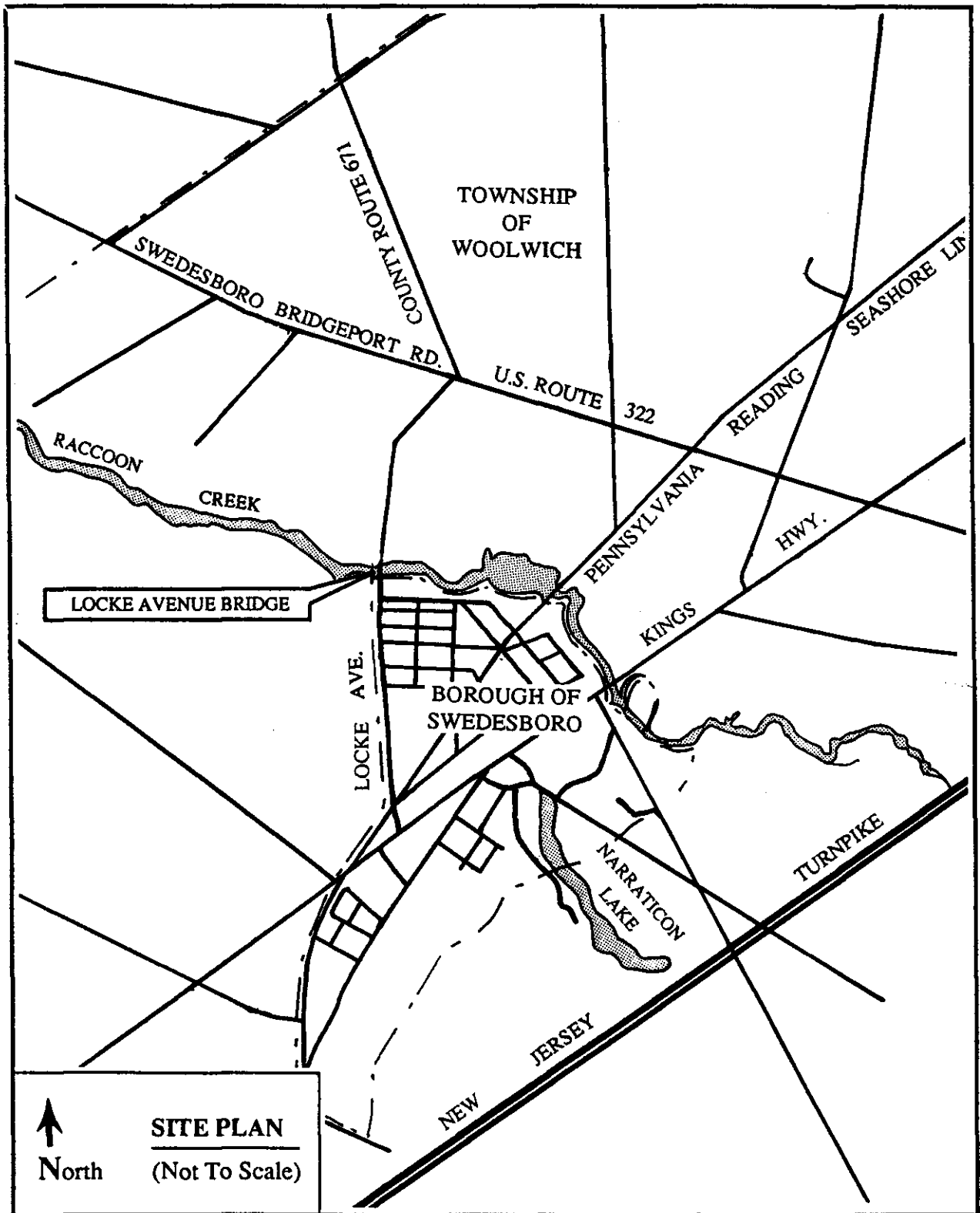
Jackson, Donald C. *Great American Bridges and Dams*. Washington, DC: Preservation Press, 1988.

McMahon, William. *South Jersey Towns; History and Legend*. New Brunswick, New Jersey: Rutgers University Press, 1973.

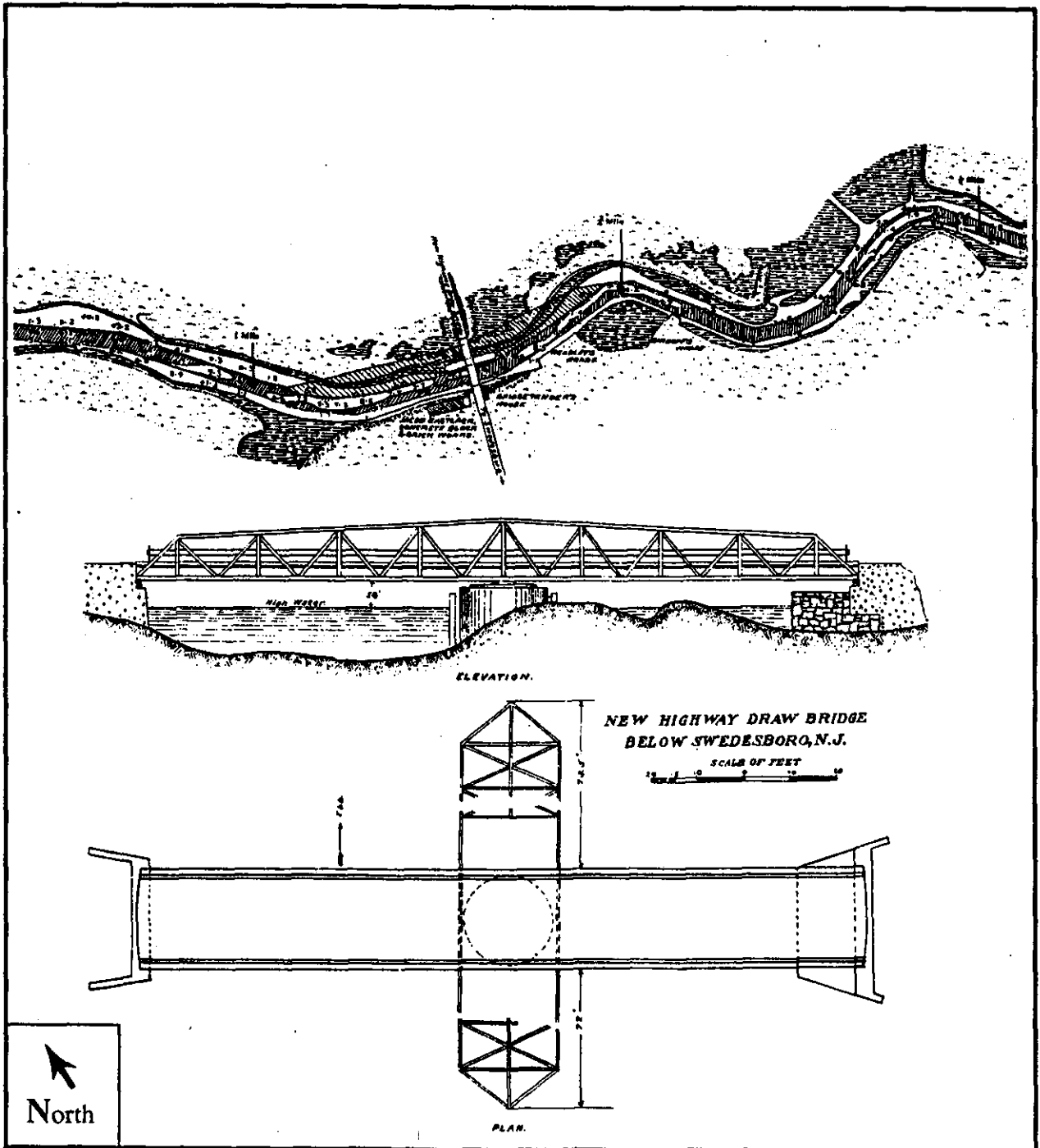
P.A.C. Spero & Company. *Delaware Historic Bridges Survey and Evaluation*. Historic Architecture and Engineering Series No. 89. Dover, DE: Delaware Department of Transportation, 1991.

Simpson, Hazel B., ed. *Under Four Flags; Old Gloucester County 1686-1964*. Woodbury, NJ: Board of Chosen Freeholders, Gloucester County, New Jersey, 1965.

The Woodbury Constitution. May 1911 - February 1912. On file at the Gloucester County Historical Society, Woodbury, New Jersey.



LOCKE AVENUE BRIDGE
 (State Bridge Number 805D04)
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Detail of Locke Avenue Bridge from map entitled, "Raccoon Creek, New Jersey" in U.S. Congress. House. Secretary of War. *Raccoon Creek, New Jersey*. 63rd Cong., 2nd sess., 1914. Doc. 800, Sheet No. 1. On file at the Technical Library, United States Army Corps of Engineers, Philadelphia District, Philadelphia, Pennsylvania.